Priority Research Direction: I/O frameworks for scalable performance for I/O pipelines.

Key emerging challenges

• The growing gap of data complexity (size, features, sources) is growing exponentially
•File systems are growing much slower than hardware
•User access patterns require new ways to increase concurrency when reading and writing to file systems
•Need to combine data movement, I/O, and in-transit processing

Summary of research direction

•I/O frameworks need to provide portable, fast, scalable, east-to-use, metadata rich output/streams with a simple API
•Software needs to be layered for abstractions of the API from the implementation for data movement/IO

Potential impact on software/systems

•OLCF supports ADIOS, and the number of customers are continually growing
•Project is used in ASCR-co-design, Exascale, NASA, NSF
•Integrating in many of the analysis, visualization frameworks (VTK, Visit, Paraview, Matlab) for sustainability

Potential impact on science communities or DOE capabilities

•By abstracting the API away from the implementation, we have created a HPC Service Oriented Architecture for coupling services efficiently together.
•Many codes could not run without ADIOS on the OLCF.